Michigan Army National Guard
Combined Support Maintenance Shop
Pollution Prevention in Painting Operations; A P2 Success Story

By Jean Linderman and Tom Pavlik[1]

When a new Combined Support Maintenance Shop (CSMS) for the Michigan Army National Guard was planned, CSMS staff knew they wanted their shop to be efficient and utilize new technologies. Saving time and money, while protecting the environment, was at the forefront of everybody's thoughts. As a result, many pollution prevention control measures were installed at the facility. This is especially true in the painting operation managed by the CSMS Allied Trades Section. New pollution prevention (P2) technologies were put to work and now their benefits are being realized. Their operation is more mission practical, environmentally sound, and therefore more sustainable.

One of the most promising new technologies utilized in the painting operation at the CSMS is the CLAWS (Closed Loop Advanced Water-jet System) used in the paint stripping bay. The CLAWS is a paint stripping operation designed to remove old paint with water instead of the typical, more commonly used blasting material. Before new paint can be applied to vehicles and equipment, any old paint must first be removed to allow for good adhesion and an even coat. The traditional way to prepare vehicles and equipment for painting is by chemical stripping, sanding, or the use of an abrasive blast media, all of which can potentially generate a significant amount of hazardous waste. Instead, CLAWS uses a high pressured water jet to remove old paint, a process that significantly reduces the amount of hazardous waste generation. The CLAWS delivers up to 40,000 psi of water pressure but only uses approximately 3 gallons per minute in water consumption. Furthermore, wastewater flowing into drains from the paint stripping operation is sent through a recycling process that utilizes a series of filters, centrifuge, and deionization tanks, thus producing clean water for re-use. Because of the closed loop feature, water is not wasted as it continuously runs through the cycle. The Allied Trades staff at the CSMS likes the ease and simplicity of this system that can strip paint at a comparable, if not faster rate than conventional stripping methods (personnel strip

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approximately 4-7 vehicles per month, in addition to numerous other pieces of equipment of varying size). Moreover, personnel do not have the added worry of generating a large amount of waste, nor do they have to spend a significant amount of time managing the waste. In fact, the CLAWS operation only generates approximately 15 lbs of hazardous waste per month or less, keeping their hazardous waste quantities from growing larger and thus keeping their operating costs low.

Another new technology in the painting process at the CSMS is the use of high volume, low pressure paint guns instead of conventional air-spray guns. The HVLP guns use less paint material than traditional guns making the painting process more efficient. More paint material hits the vehicle. Less paint is sent airborne which means less over-spray that would otherwise end up in the paint booth filtering system. The reduction in filter use and disposal saves time and money. So does the fact that less product is used. The painters also note that clean up is easier and less labor intensive.

The CSMS has made the switch from using a solvent-based Chemical Agent Resistant Coating (CARC) paint and primer to a water-based CARC paint and primer on tactical vehicles. The water-based CARC and primer contain no hazardous air pollutants such as methyl isobutyl ketone or toluene, and therefore have significantly reduced air emissions of Volatile Organic Compounds (VOCs). Water-based CARC and primer were created to meet Clean Air Act regulations but they also have the added benefit of being safer for painters, and significantly reduce the hazardous waste stream volume for the painting operation. Moreover, from a mission perspective, the water-based CARC and the water-based primer are less labor intensive to use, and the water-based CARC paint reportedly is up to 3 times more durable than conventional solvent-based CARC paint.

The CSMS Allied Trades Section realizes that having the right equipment and using the right materials are not enough in the painting process. “Having properly trained painting technicians is also paramount to an efficient painting operation” states Chief Warrant Officer Richard Wilder, Supervisor of the CSMS Allied Trades Section. According to Wilder, the techniques and habits of the painters can have considerable influence on the amount of waste generated. Therefore, each painter is sent to the STAR4D (Spray Technique Analysis and Research for Defense) program, a three-day training course for military coatings operations. The program teaches effective spraying techniques to maximize coating efficiency and minimize environmental pollution. The results of training studies at the STAR4D program that compares pre-training data to post-training data show an increase in transfer efficiency of 23%, a decrease in material consumption of more than 15%, and a reduction of VOC air emissions of over 15%.

In a costly business such as painting, pollution prevention is an invaluable tool to not only minimize the waste streams but also to reduce costs. According to Wilder, the total hazardous waste disposal cost for the painting operation was less than $1,000 for FY 2007. “If it wasn’t for pollution prevention initiatives that we employ in our painting operation I have to believe our operating costs would be much higher, perhaps even an order of magnitude higher”, said Wilder.